



1971

OPERATING
SUMMARY

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CORNWALL

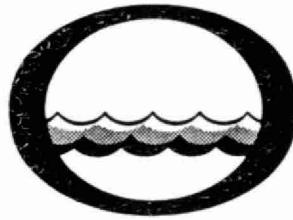
WATER POLLUTION CONTROL PLANT

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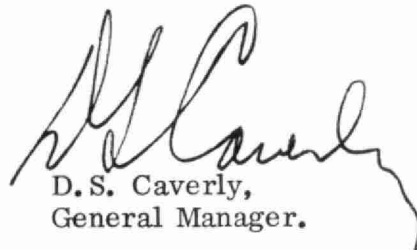


Water management in Ontario


Ontario
Water Resources
Commission

We are pleased to submit for your consideration a summary of operation during 1971 of the water pollution control plant serving your community.

This operating summary contains parameters normally used to measure plant performance and loading, as well as relevant cost data. Because of the concern over eutrophication of our lakes and of the requirement, in many parts of Ontario, to remove the major contributing factor, results of analysis for phosphorus appear in this summary.



D.S. Caverly,
General Manager.



D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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CORNWALL

ST. LAWRENCE RIVER

WATER POLLUTION CONTROL CENTRE NO. 1

1971 ANNUAL OPERATING SUMMARY

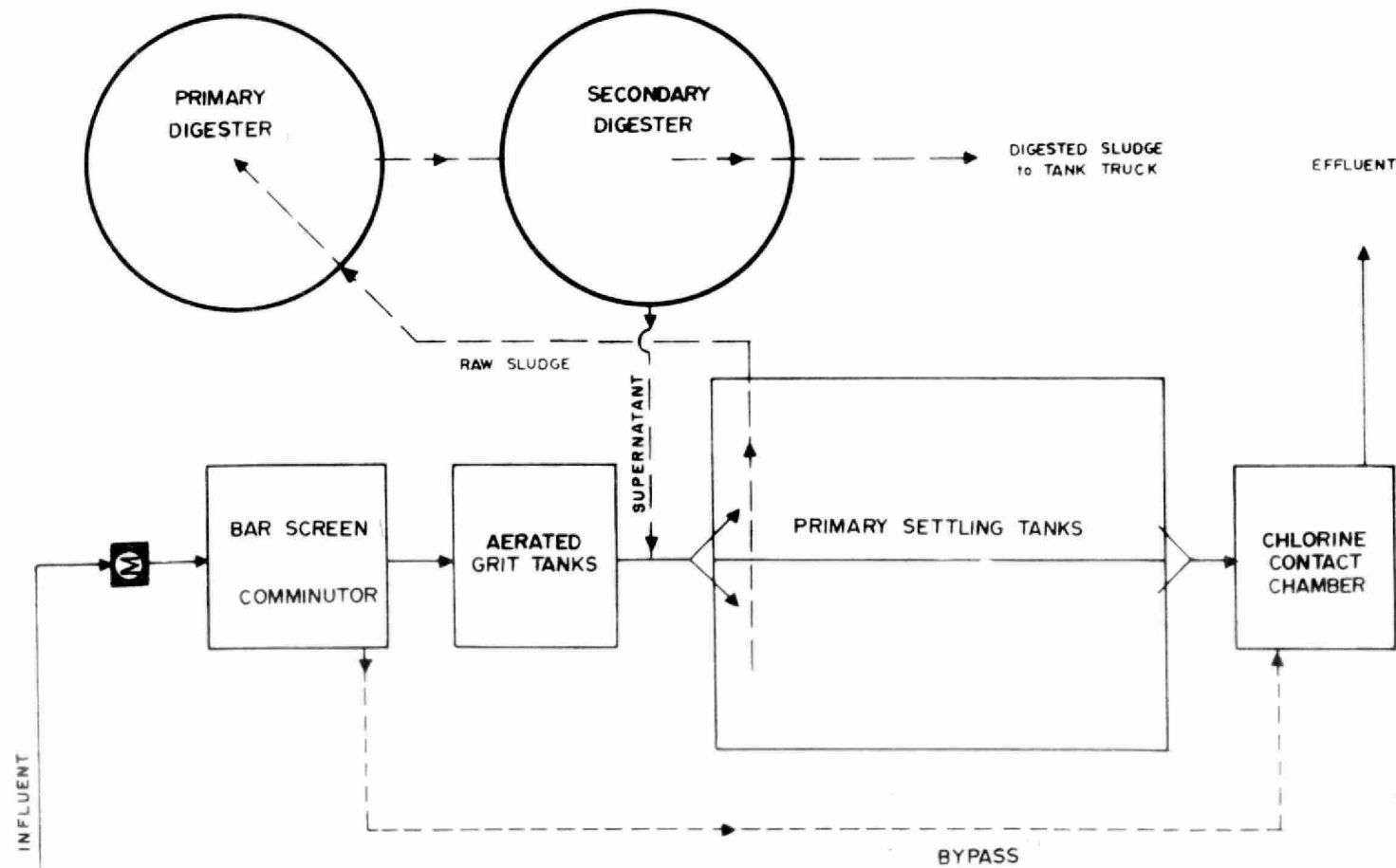


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ST. LAWRENCE RIVER
WATER POLLUTION CONTROL CENTRE No.1
(CORNWALL)



DESIGN DATA

| | | | |
|-------------------|-----------|---|---|
| PROJECT NO. | 1-0001-66 | <u>PRIMARY TREATMENT</u> | <u>CHLORINATION</u> |
| DESIGN FLOW | 8.25 mgd | <u>Comminution</u> | <u>Chlorinator</u> |
| DESIGN POPULATION | 66,000 | Type: Barminutor Size: Two Type "C" | Type: W & T Size: One 2,000 lb/day with evaporator |
| | | <u>Screening (Bypass channel)</u> | <u>Chlorine Contact Chamber</u> |
| | | Size: 2" spaces | Size: One 48' 7" x 26' 11" x 10' 6" (85,800 gal) |
| | | <u>Grit Removal</u> | Retention: 15 min |
| | | Type: Aerated; grit removed by clamshell bucket Size: Two 38' 6" x 15' 10" x 13' 5" swd (98,500 gal) Retention: 17 min | <u>OUTFALL</u> |
| | | <u>Air Supply</u> | - to St. Lawrence River |
| | | Type: Hoffman Size: Two 1,100 scfm (also for channel aeration) | <u>SLUDGE HANDLING</u> |
| | | <u>Primary Sedimentation</u> | <u>Digestion System - Two-stage</u> |
| | | Type: Jeffrey Size: Two 143' x 48' x 12' (1.245 mil gal) Retention: 3 hours Loading: Surface, 600 gal/ft ² /day Weir, 14300 gal/ft/day | Primary Digester - Type: Perth (gas mixed) with fixed concrete cover Size: One 65' dia x 24' swd (82,500 cu ft or 0.515 mil gal) Loading: 2.88 lb/cu ft/mo |
| | | | Secondary Digester - Size: One 65' dia x 24' swd (82,500 cu ft or 0.515 mil gal) Total Loading: 1.44 lb/cu ft/mo |
| | | | <u>Disposal</u> |
| | | | - by tank truck |

'71 Review

GENERAL

The total volume of raw sewage treated at the plant was 3065 million gallons. The average daily flow of 8.40 mgd was equal to 102 percent of the design capacity of the plant. The design daily flow of the plant was exceeded 30 percent of the time.

The Cornwall water pollution control plant consists of an 8.35 IMGD primary treatment plant, a pumping station and interceptor and associated trunk sewers. The following is a summary of some of the more significant operating problems encountered during 1971.

A failure occurred in the electrical controls for the main sewage pumps at the pumping station which resulted in a considerable amount of damage to one of the 200 hp motors. Subsequent investigation revealed a faulty breaker which was replaced with a new unit.

A program was started to repaint all buildings and equipment.

Problems were experienced in the early part of the year, with industrial wastes in the raw sewage. Substantial quantities of Perolite and Bunker "C" oil had to be removed from the primary tanks on several occasions. The source of these wastes were traced to several industries who were unaware that these wastes were gaining entry into the sanitary sewers. Repairs and modifications were undertaken by the industries in an effort to eliminate this problem.

EXPENDITURES

The cost of operating the project in 1971 was \$228,190.17. This greatly exceeded the budget of \$124,000. The prime reason for the increase was the municipal taxes totaling \$94,274.16. Excluding the taxes for 1969 and 1970 the operating costs were \$160,969.64. This represents a cost of \$52.52 per million gallons of sewage or 19 cents per pound of BOD removed.

PLANT FLOWS

A total of 3,065 million gallons of sewage was treated at the plant during 1971 representing an average daily flow of 8.41 million gallons. The daily flow exceeded the design capacity of the plant approximately 30 percent of the time.

PLANT EFFICIENCY

The average influent BOD and suspended solids concentrations were 77 mg/l and 154 mg/l respectively. The effluent BOD and suspended solids concentrations were 50 mg/l and 73 mg/l respectively representing a reduction in BOD of 35 percent and suspended solids of 53 percent. This is a slight decrease in efficiency from 1970 and is due to the increased hydraulic loadings on the plant.

SLUDGE DIGESTION and DISPOSAL

A total of 6.06 million gallons of raw sludge with an average solids concentration of 5.3 percent was pumped to the digesters. A total of 1.28 million gallons of digested sludge with a solids concentration of 8.2 percent was removed by tank truck. The average volatile solids concentration of 44 percent indicates that the sludge was well digested prior to removal.

CONCLUSIONS

Although there were a few minor operating problems the Cornwall project operated satisfactorily in 1971. The quality of the plant effluent also remained satisfactory.

ONTARIO WATER RESOURCES COMMISSION

CORNWALL SEWAGE WORKS SYSTEM

PROJECT NO. 1-0001-66

BALANCE SHEET

AS AT DECEMBER 31, 1971

(UNAUDITED)

ASSETS

| | |
|------------------------|----------------|
| ACCOUNTS RECEIVABLE | \$ 166,881.20 |
| FIXED ASSETS (at cost) | 6,062,265.21 |
| | <hr/> |
| TOTAL ASSETS | \$6,229,146.41 |
| | <hr/> |

LIABILITIES AND EQUITY

| | |
|---------------------------------------|----------------|
| CURRENT LIABILITIES | \$ 106,938.46 |
| LONG TERM DEBT | 4,435,209.65 |
| EQUITY | |
| Contributed | 1,017,476.04 |
| Amortized principal on long term debt | 86,521.13 |
| Earned Surplus | |
| Surplus at beginning of year | \$372,168.64 |
| Surplus for the year 1971 | \$210,832.49 |
| | 583,001.13 |
| | <hr/> |
| TOTAL LIABILITIES AND EQUITY | \$6,229,146.41 |
| | <hr/> |

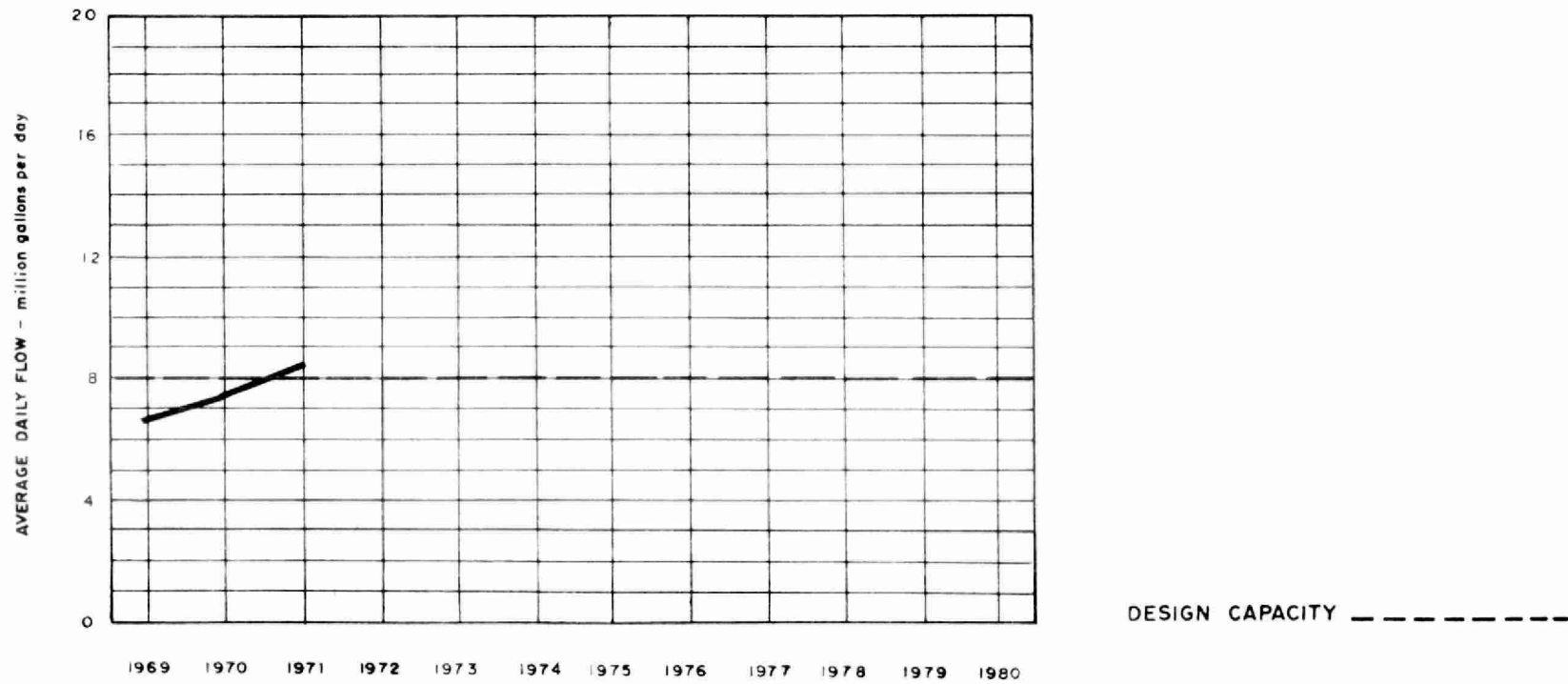
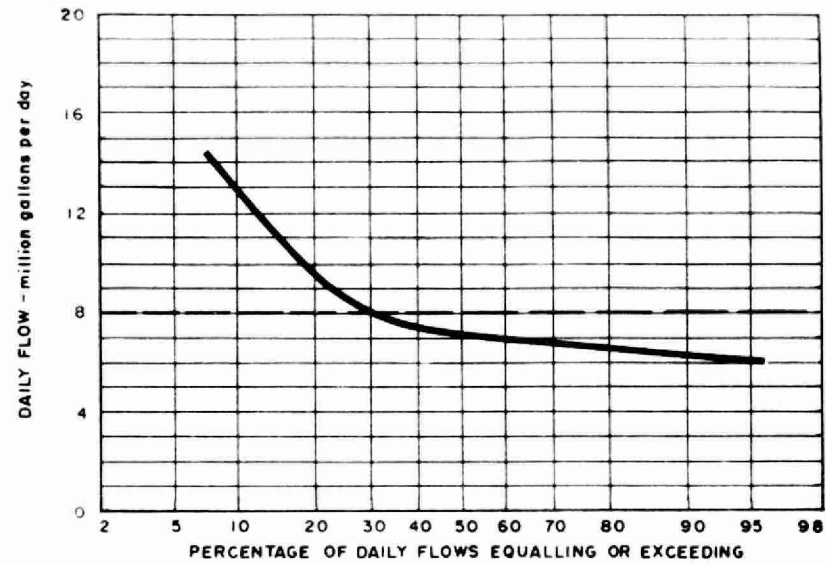
Note

Prepared on accrued basis.



PROCESS DATA

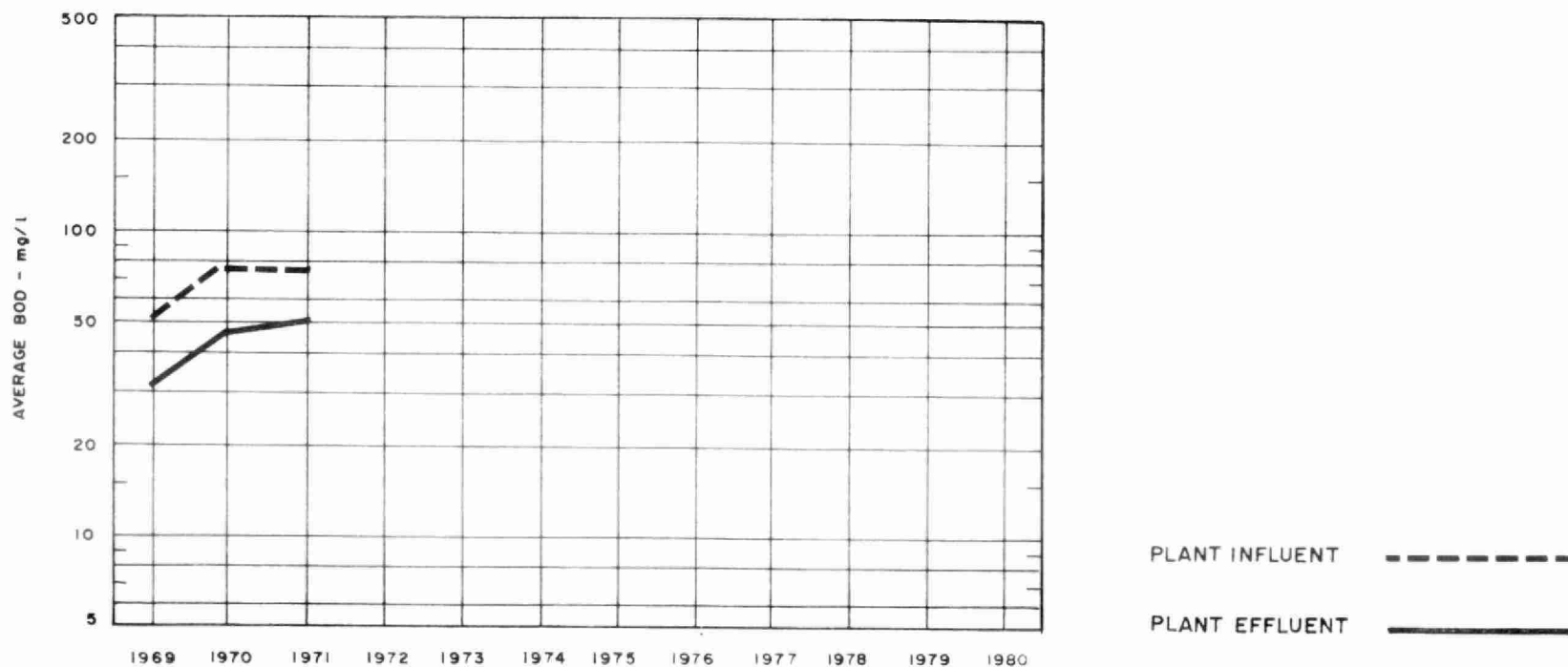
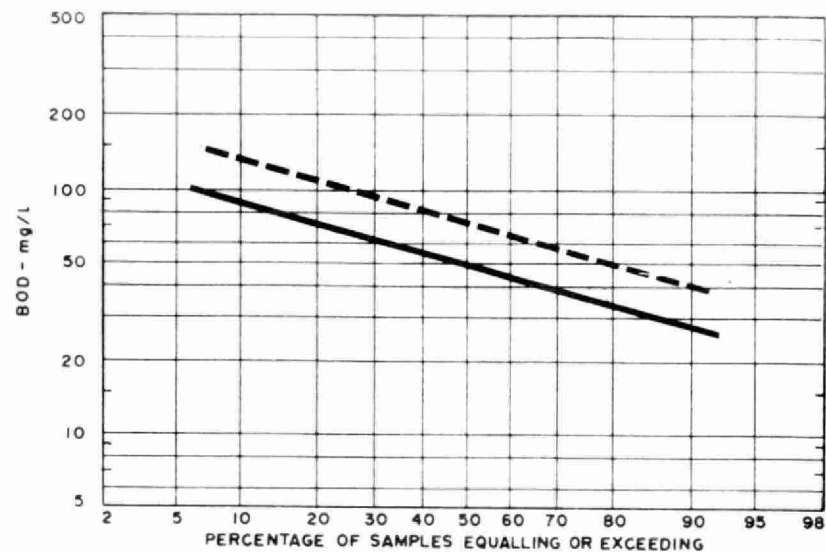
FLOWS



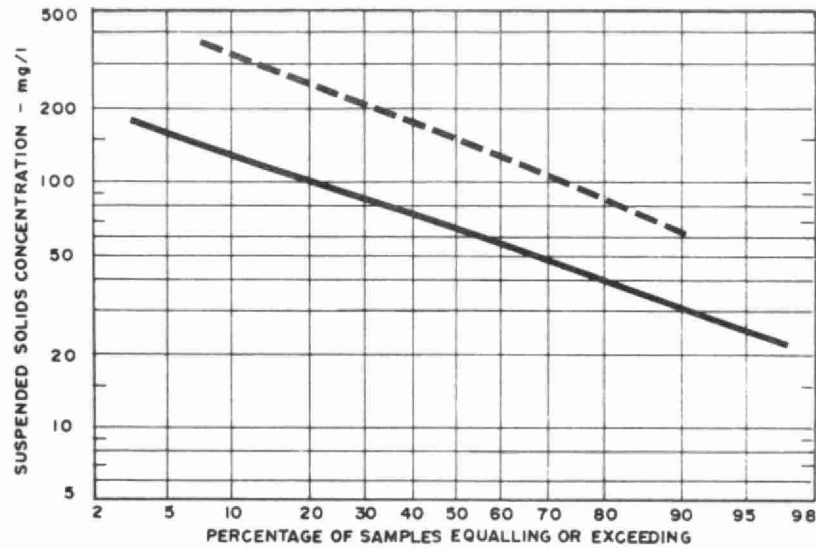
PLANT PERFORMANCE

| MONTH | FLOWS | | | | BIOCHEMICAL OXYGEN DEMAND | | | | SUSPENDED SOLIDS | | | | TOTAL PHOSPHORUS | | |
|----------------|-----------------|-------------|-----------------|-----------------|---------------------------|----------|-----------|------------------------|------------------|----------|-----------|------------------------|------------------|-----------|------|
| | TOTAL FLOW | AVERAGE DAY | MAXIMUM DAY | MAXIMUM RATE | INFLUENT | EFFLUENT | REDUCTION | | INFLUENT | EFFLUENT | REDUCTION | | INFLUENT | EFFLUENT | REDU |
| | million gallons | mil gal | mil gal | mgd | mg/l | mg/l | % | 10 ³ pounds | mg/l | mg/l | % | 10 ³ pounds | mg/l as P | mg/l as P | % |
| JAN | 193 | 6.2 | 7.6 | 19.5 | 110 | 62 | 44 | 92 | 141 | 63 | 55 | 150 | 5.9 | 4.2 | 29 |
| FEB | 193 | 6.9 | 13.4 | 20.6 | 80 | 48 | 40 | 62 | 116 | 52 | 55 | 124 | 6.0 | 4.0 | 33 |
| MAR | 329 | 10.6 | 18.8 | 21.5 | 47 | 31 | 34 | 52 | 116 | 64 | 45 | 171 | 4.4 | 3.8 | 14 |
| APR | 533 | 17.8 | 20.5 | 23.1 | 28 | 16 | 43 | 64 | 70 | 36 | 49 | 181 | 2.1 | 2.0 | 5 |
| MAY | 269 | 8.7 | 17.8 | 20.5 | 113 | 54 | 43 | 164 | 93 | 54 | 54 | 135 | 5.4 | 4.9 | 9 |
| JUNE | 215 | 7.2 | 11.4 | 21.5 | 88 | 44 | 50 | 94 | 283 | 132 | 53 | 325 | 7.4 | 5.4 | 27 |
| JULY | 224 | 7.2 | 10.0 | 23.8 | 55 | 44 | 20 | 25 | 203 | 91 | 55 | 251 | 4.3 | 5.5 | 0 |
| AUG | 220 | 7.2 | 14.1 | 23.5 | 78 | 65 | 17 | 29 | 195 | 118 | 39 | 171 | 5.1 | 4.9 | 4 |
| SEPT | 224 | 7.5 | 12.2 | 25.0 | 30 | 38 | 0 | 0 | 201 | 76 | 62 | 280 | 3.7 | 3.4 | 8 |
| OCT | 200 | 6.5 | 7.8 | 19.4 | 93 | 58 | 38 | 70 | 151 | 45 | 70 | 212 | 7.3 | 5.1 | 30 |
| NOV | 200 | 6.7 | 8.7 | 17.0 | 98 | 74 | 24 | 48 | 106 | 50 | 53 | 112 | 9.7 | 6.0 | 38 |
| DEC | 265 | 8.5 | 15.5 | 23.8 | 88 | 40 | 50 | 127 | 109 | 62 | 43 | 124 | 8.2 | 5.5 | 33 |
| TOTAL | 3065 | - | - | - | - | - | - | 827 | - | - | - | 2236 | - | - | - |
| AVG. | - | 8.4 | MAXIMUM 20.5 | MAXIMUM 25.0 | 77 | 50 | 35 | 69 | 154 | 73 | 53 | 186 | 5.8 | 4.6 | 21 |
| No. of Samples | - | - | - | - | 29 | 29 | - | - | 117 | 117 | - | - | 22 | 21 | - |

BIOCHEMICAL OXYGEN DEMAND

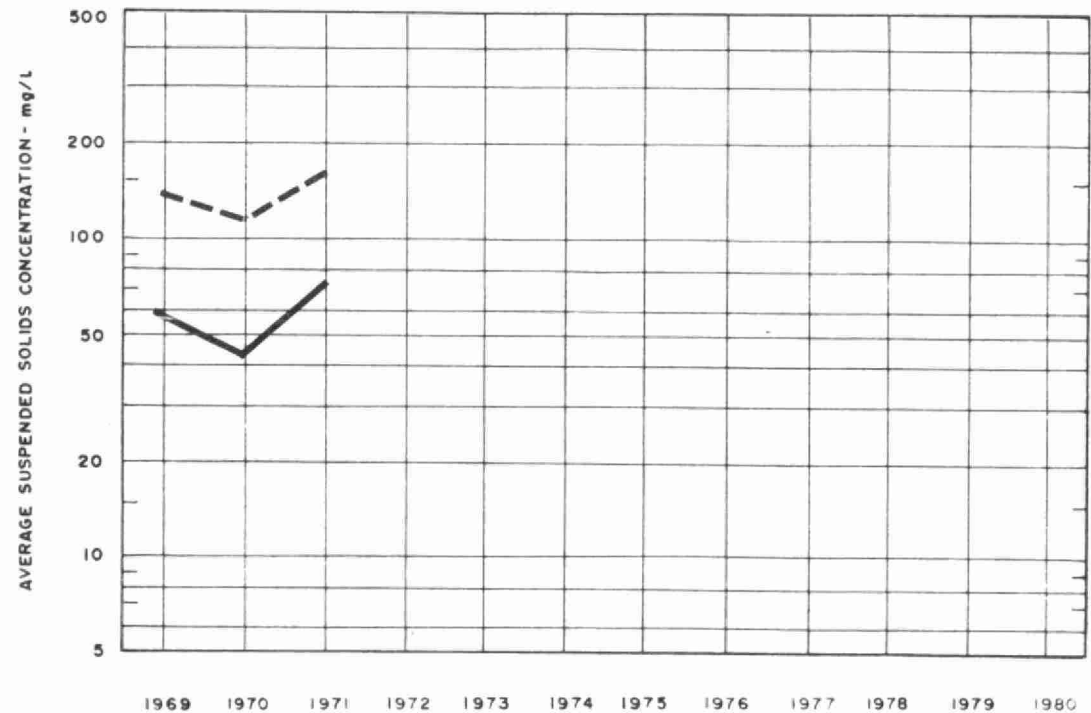


SUSPENDED SOLIDS



PLANT INFLUENT - - - - -

PLANT EFFLUENT _____

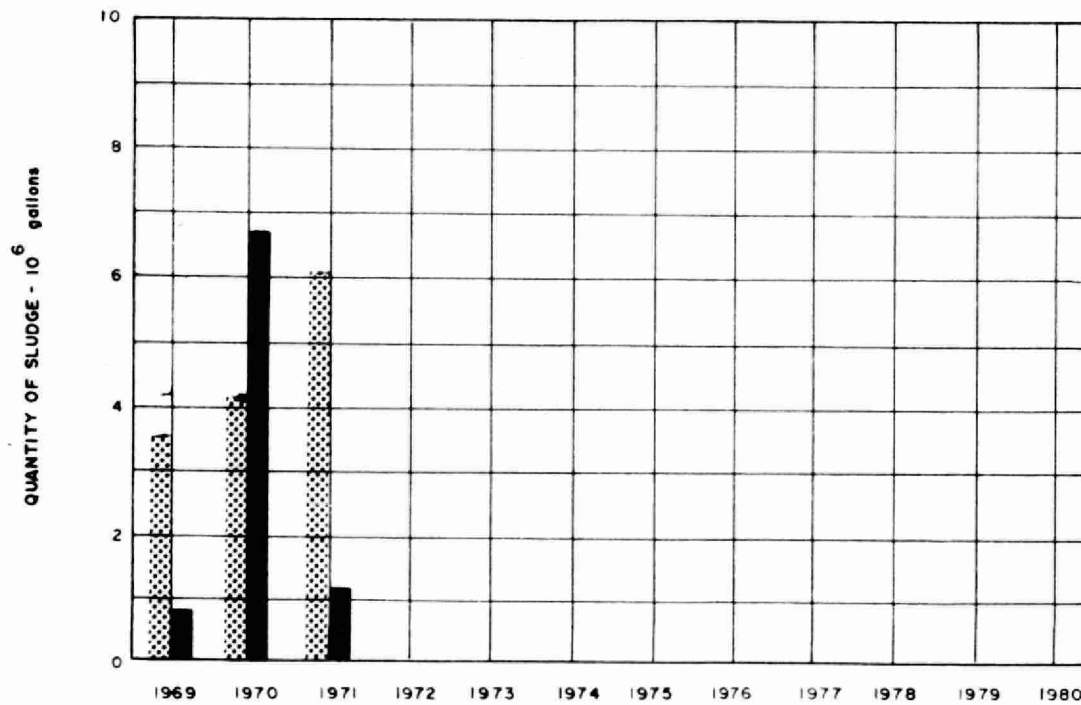
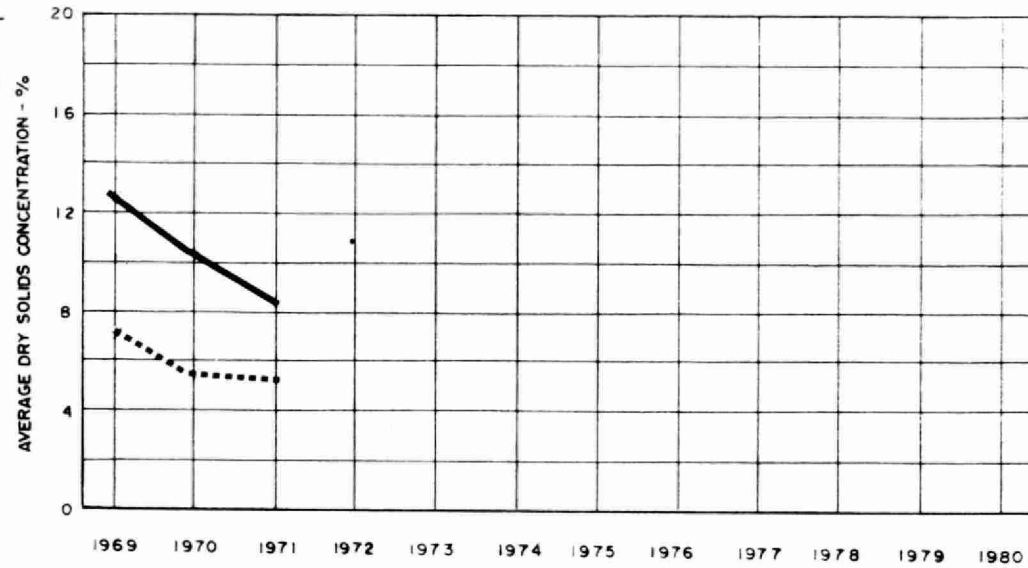


TREATMENT DATA

| MONTH | GRIT | CHLORINATION | | SLUDGE DIGESTION and DISPOSAL | | | | | | | |
|-------|-----------------------------------|--|---------------------------|--|----------------------|-------------------------|---|----------------------|-------------------------|----------------------|---------------------------------|
| | QUANTITY REMOVED cubic feet | CHLORINE USED 10 ³ pounds | AVERAGE DOSAGE mg/l | RAW SLUDGE | | | DIGESTED SLUDGE | | | SUPERNATANT | SLUDGE HAULED cubic yards |
| | | | | QUANTITY 10 ³ gallons | TOTAL SOLIDS % | VOLATILE SOLIDS % | QUANTITY REMOVED 10 ³ gallons | TOTAL SOLIDS % | VOLATILE SOLIDS % | TOTAL SOLIDS % | |
| JAN | 0 | 0 | 0 | 406 | 4.6 | 70 | 52 | 6.4 | 48 | .3 | 306 |
| FEB | 0 | 0 | 0 | 351 | - | - | 57 | 8.4 | 46 | .5 | 336 |
| MAR | 486 | 0 | 0 | 536 | 2.4 | 68 | 73 | 9.4 | 44 | 3.0 | 435 |
| APR | 648 | 0 | 0 | 431 | 7.9 | 46 | 78 | 11.0 | 41 | 2.9 | 462 |
| MAY | 0 | 6 | 4.2 | 415 | 4.2 | 68 | 152 | 8.6 | 42 | .2 | 903 |
| JUNE | 324 | 13 | 6.2 | 481 | 6.8 | 58 | 85 | 7.8 | 43 | .4 | 504 |
| JULY | 351 | 15 | 6.5 | 548 | 7.1 | 57 | 99 | 8.7 | 45 | 1.7 | 587 |
| AUG | 0 | 14 | 6.4 | 547 | 4.8 | 65 | 138 | 8.3 | 41 | .9 | 819 |
| SEPT | 0 | 14 | 6.1 | 559 | - | - | 148 | 9.0 | 42 | 2.8 | 875 |
| OCT | 189 | 15 | 7.6 | 687 | 5.6 | 61 | 129 | 5.7 | 48 | 3.0 | 763 |
| NOV | 0 | 0 | 0 | 473 | 4.5 | 72 | 129 | 6.2 | 49 | 4.8 | 763 |
| DEC | 0 | 0 | 0 | 627 | 4.6 | 65 | 140 | 6.6 | 46 | 4.4 | 833 |
| TOTAL | 1998 | 77 | - | 6061 | - | - | 1280 | - | - | - | 7586 |
| AVG. | .7 cubic feet/mil gal | 13 | 6.3 | 505 | 5.3 | 63 | 107 | 8.2 | 44 | 2.1 | 632 |

DIGESTION

RAW SLUDGE
DIGESTED SLUDGE ———



RAW SLUDGE TO DIGESTER
DIGESTED SLUDGE REMOVED ———

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